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NORMS CONSTRUCTION FOR MUSCULAR STRENGTH, MUSCULAR POWER AND MUSCULAR ENDURANCE OF BASKETBALL PLAYERS OF GURU NANAK DEV UNIVERSITY, AMRITSAR, PUBJAB, INDIA

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Abstract:
The aim of this study was to construct norms for Muscular Strength, Muscular Power and Muscular Endurance of male Basketball Players. Seventy Two, male Basketball Players of Guru Nanak Dev University, Amritsar between the age group of 19-25 years (Mean ± SD: Age 22.263 ± 1.332 years, Body Height 180.75 ± 6.008 centimeters and Body Mass 77.526 ± 5.960 kilograms) volunteered to participate in the study. Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). The data, which was collected by administering tests, was statistically treated to develop for all the test items. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e., very good, good, average, poor and very poor. In Muscular Strength, the scores below 43.296 are considered very poor, from about 45.995-43.296 is considered poor, 45.995-51.393 is considered average, 51.393-54.092 is considered good and the scores above 54.092 are considered very good. In Muscular Power, the scores below 41.913 are considered very poor, from about 43.991-41.913 is considered poor, 43.991-48.147 is considered average, 48.147-50.225 is considered good and the scores above 50.225 are considered very good. In Muscular Endurance, the scores below 4.39 are considered very poor, from about 5.438-4.39 is considered poor, 5.438-7.534 is considered average, 7.534-8.582 is considered good and the scores above 8.582 are considered very good.

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Key words: norms, basketball players, muscular strength, muscular power and muscular endurance

1. Introduction

Basketball has been described as an intermittent sport, being physically very demanding, requiring players to frequently repeat bouts of intense actions (sprinting, shuffling, jumping) with jogging, walking or short periods of recovery (Ben Abdelkrim, El Fazaa, & El Ati, 2006; McInnes, Carlson, Jones, & McKenna, 1995).

Consequently, in order to play successfully, basketball players must be physically well prepared by having optimally developed levels of explosive power, agility, anaerobic power and anaerobic capacities (Apostolidis, Nassis, Bolatoglou, & Geladas, 2004; Ben Abdelkrim, Chaouachi, Chamari, Chtara, & Castagna, 2010; Delextrat & Cohen, 2008; Hoffman, Tenenbaum, Maresh, & Kraemer, 1996).

There have been many studies in team sports linking fitness and/or anthropometric test scores to playing level and success in sports such as American football, (Fry A, & Kraemer W, 1991; Black W, & Roundy E, 1994) soccer, (Abrantes C, Ma¸c as V, Sampaio J, 2004) rugby union, (Quarrie KL, Handcock P, Waller AE, 1995) Australian rules football, (Young WB, Pryor L, 2007) field hockey, (Keogh JW, Weber CL, Dalton CT, 2003) volleyball (Gualdi-Russo E, Zaccagni L., 2001) and basketball (Drinkwater EJ, Hopkins WG, McKenna MJ, 2007; Hoare DG, 2000).

2. Material and Methods

2.1 Selection of Subjects

Seventy Two, male Basketball Players of Guru Nanak Dev University, Amritsar between the age group of 19-25 years (Mean ± SD: Age 22.263 ± 1.332 years, Body Height 180.75 ± 6.008 centimeters and Body Mass 77.526 ± 5.960 kilograms) volunteered to participate in the study. The subject details are presented in Table 1 and exhibited in Figure 1.

Table 1: Details of subjects

Sr. No.	College	Sample (N=72)
1.	D.A.V., College, Amritsar	12
2.	Khalsa, College, Amritsar	12
3.	G.N.D. University, Campus, Amritsar	12
4.	D.A.V., College, Jalandhar	12
5.	Lyallpur Khalsa College, Jalandhar	12
6.	SSM College Dinanagar, Gurdaspur	12

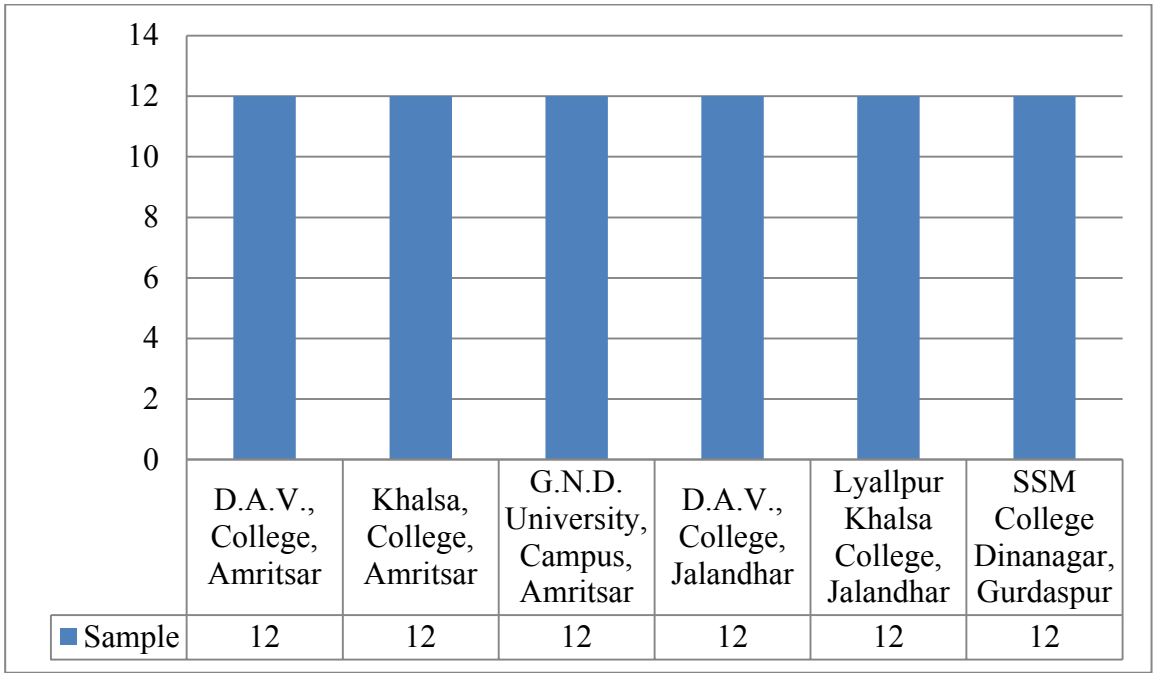


Figure 1: Details of subject

Table 2: Subject's demographics of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

Variables	Sample Size (N=72)	D.A.V., College, Amritsar (N_1=12)	Khalsa, College, Amritsar (N_2=12)	G.N.D. University, Campus, Amritsar (N_3=12)	D.A.V., College, Jalandhar (N_4=12)	Lyallpur Khalsa College, Jalandhar (N_5=12)	SSM College Dinanagar, Gurdaspur (N_6=12)
Age (years)	22.263 ± 1.332	22.583 ± 1.240	22.416 ± 1.378	22.166 ± 1.466	21.666 ± 1.669	22.25 ± 1.138	22.5 ± 1.087
Body Height (centimeters)	180.75 ± 6.008	180 ± 6.564	181.33 ± 5.959	179.83 ± 6.235	181.166 ± 6.548	181.25 ± 5.863	180.91 ± 5.991
Body Mass (kilograms)	77.526 ± 5.960	77.066 ± 6.463	77.35 ± 5.843	76.125 ± 5.526	78.741 ± 6.626	77.991 ± 6.159	77.883 ± 6.050

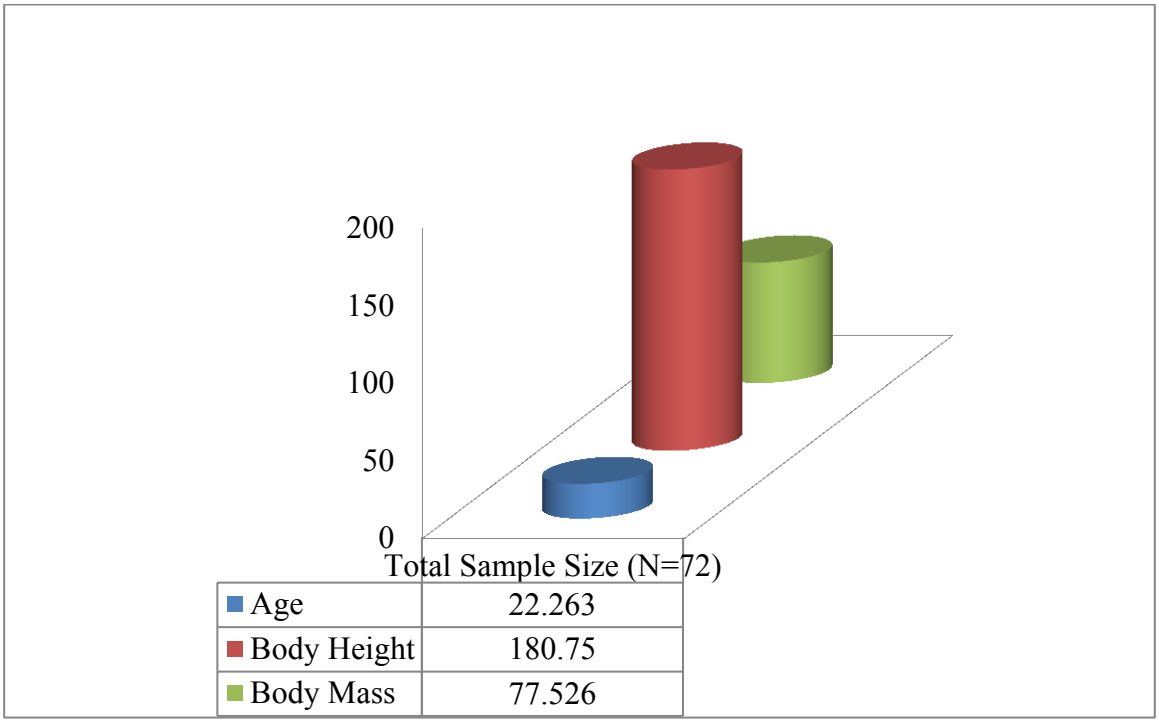


Figure 2: Subject's demographics of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

2.2 Selection of Variables

The following Physical Fitness Test Items were selected for the present study:

Sr. No.	Variables	Test
1.	Muscular Strength	Handgrip Strength Test
2.	Muscular Power	Vertical Jump Test
3.	Muscular Endurance	Pull-Up Test

3. Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences for Windows version 16.0 software (SPSS Inc., Chicago, IL). The data, which was collected by administering tests, was statistically treated to develop for all the test items. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e., very good, good, average, poor and very poor.

4. Results

For each of the chosen variable, the result pertaining to Descriptive Statistics (Mean and SD) and Percentile Plot (Hi and Low) of Physical Fitness Test Items of Basketball Players of Guru Nanak Dev University, Amritsar are presented in the following tables:

Table 3: Descriptive Statistics (Mean and SD) and Percentile Plot (Hi and Low) of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

Sr. No.	Test Items	Mean ± SD		Hi	Low
1.	Muscular Strength	Mean	48.694	55.00	42.00
		SD	2.699		
2.	Muscular Power	Mean	46.069	40.00	49.00
		S.D	2.078		
3.	Muscular Endurance	Mean	6.486	8.000	4.000
		SD	1.048		

In Muscular Strength, the mean score was 48.694 and standard deviation score was 2.699. In Muscular Power the mean score was 46.069 and standard deviation score was 2.078. Whereas in Muscular Endurance, the mean score was 6.486 and standard deviation score was 1.048.

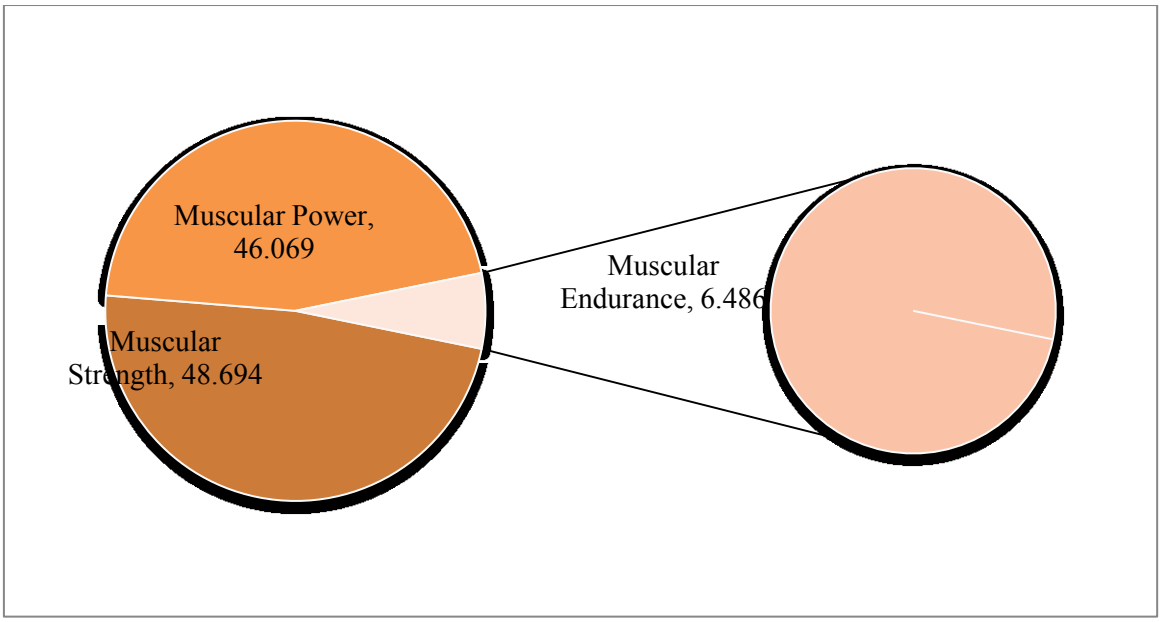


Figure 3: Descriptive Statistics (Mean and SD) of selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power and c. Muscular Endurance of male basketball players of Guru Nanak Dev University, Amritsar (N=72)

4.1 Grades under Normal Distribution

Five types of classification/grades i.e., Very Poor, Poor, Average, Good and Very Good have also been prepared under Normal Distribution. Grades have been presented in Table 4.

Table 4: Grading of selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power and c. Muscular Endurance of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

Test Items	Very Poor	Poor	Average	Good	Very Good
Muscular Strength	Less than (<) 43.296	45.995-43.296	45.995-51.393	51.393-54.092	Greater than (>)54.092
Muscular Power	Less than (<) 41.913	43.991-41.913	43.991-48.147	48.147-50.225	Greater than (>)50.225
Muscular Endurance	Less than (<) 4.39	5.438-4.39	5.438-7.534	7.534-8.582	Greater than (>)8.582

4.2 Muscular Strength

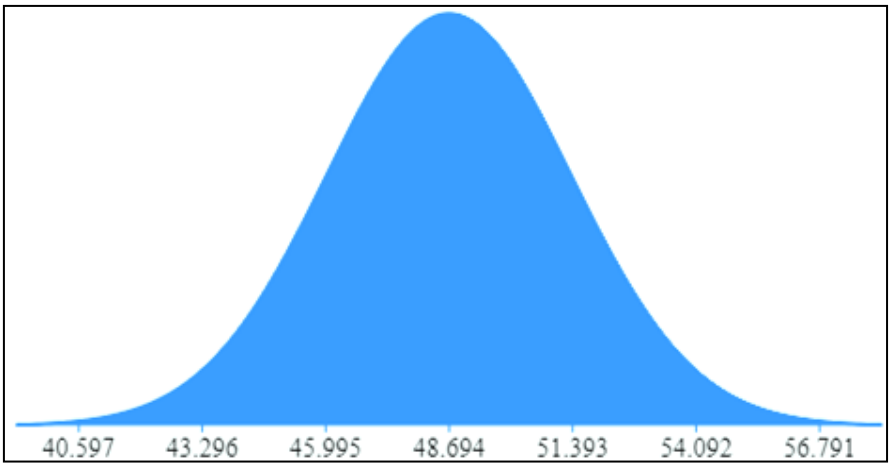
- In Muscular Strength, the scores below 43.296 are considered very poor, from about 45.995-43.296 is considered poor, 45.995-51.393 is considered average, 51.393-54.092 is considered good and the scores above 54.092 are considered very good

4.3 Muscular Power

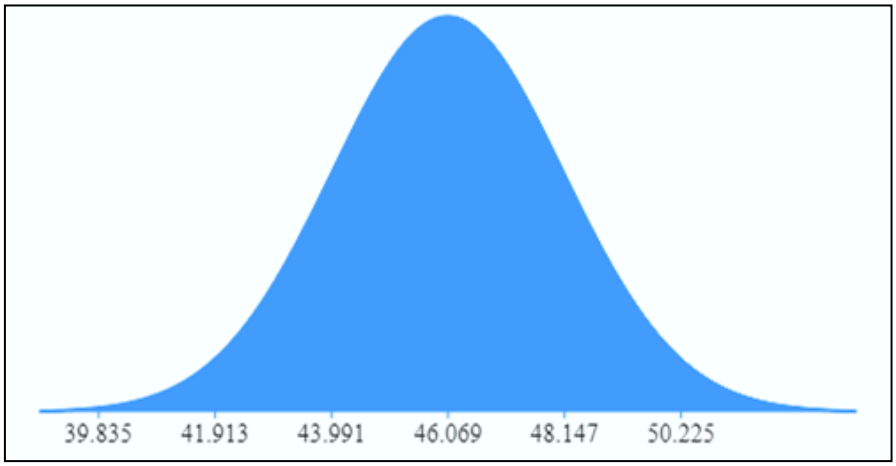
- In Muscular Power, the scores below 41.913 are considered very poor, from about 43.991-41.913 is considered poor, 43.991-48.147 is considered average, 48.147-50.225 is considered good and the scores above 50.225 are considered very good.

4.4 Muscular Endurance

- In Muscular Endurance, the scores below 4.39 are considered very poor, from about 5.438-4.39 is considered poor, 5.438-7.534 is considered average, 7.534-8.582 is considered good and the scores above 8.582 are considered very good.



(a)



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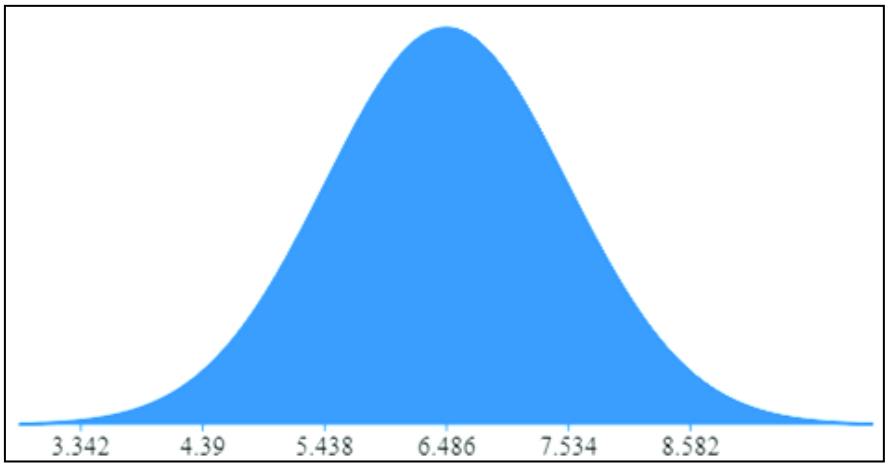

(c)

Figure 4: Normal distribution of selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power and c. Muscular Endurance of male Basketball Players of Guru Nanak Dev University, Amritsar (N=72)

5. Conclusions

According to the results, we can conclude that the in Muscular Strength, the scores below 43.296 are considered very poor, and the scores above 54.092 are considered very good. In Muscular Power, the scores below 41.913 are considered very poor, and the scores above 50.225 are considered very good. In Muscular Endurance, the scores below 4.39 are considered very poor, and the scores above 8.582 are considered very good.

In practice, the results can be very useful for the physical education teachers, trainers and coaches of Basketball players to estimate the performance of their players/trainees and to improve the instructional programmes and training module accordingly.

Furthermore, this study may provide appropriate percentile norms of specific physical fitness items of male Basketball players and may offer distribution of grades under normal distribution.

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References

1. Ben Abdelkrim, N., El Fazaa, S., & El Ati, J. (2006). Time-motion analysis and physiological data of elite under-19-year-old basketball players during competition. British Journal of Sports Medicine, 41, 69-75.
2. McInnes, S.E., Carlson, J.S., Jones, C.J., & McKenna, M.J. (1995). The physiological load imposed on basketball players during competition. Journal of Sport Science, 13, 387-97.
3. Apostolidis, N., Nassis, G.P., Bolatoglou, T., & Geladas, N.D. (2004). Physiological and technical characteristics of elite young basketball players. Journal of Sports Medicine and Physical Fitness, 44, 157-163.
4. Ben Abdelkrim, N., Chaouachi, A., Chamari, K., Chtara, M., & Castagna, C. (2010). Positional role and competitive-level differences in elite-level men's basketball players. Journal of Strength and Conditioning Research, 24, 1346-1355.
5. Delextrat, A., & Cohen, D. (2008). Physiological testing of basketball players: toward a standard evaluation of anaerobic fitness. Journal of Strength and Conditioning Research, 22, 1066-1072.
6. Hoffman, J.R., Tenenbaum, G., Maresh, C.M., & Kraemer, W.J. (1996). Relationship between athletic performance tests and playing time in elite college basketball players. Journal of Strength and Conditioning Research, 10, 67-71.
7. Fry, A. & Kraemer W. (1991). Physical performance characteristics of American collegiate football players. J Strength Cond Res 4. 5 (3): 126-38.
8. Black, W. & Roundy, E. (1994). Comparisons of size, strength, speed, and power in NCAA Division 1-A football players. J Strength Cond Res, 8 (2): 80-5.

9. Abrantes, C., Macas, V. & Sampaio, J. (2004). Variation in football players' sprint test performance across different ages and levels of competition. J Sports Sci Med, 3 (YISI 1): 44-9.
10. Quarrie, K.L., Handcock, P. & Waller, A.E. (1995). The New Zealand rugby injury and performance project. III: anthropometric and physical performance characteristics of players. Br J Sports Med, 29 (4): 263-70.
11. Young, W.B., & Pryor, L. (2007). Relationship between pre-season anthropometric and fitness measures and indicators of playing performance in elite junior Australian Rules football. J Sci Med Sport, 10 (2): 110-8.
12. Keogh, J.W., Weber, C.L. & Dalton, C.T. (2003). Evaluation of anthropometric, physiological, and skill-related tests for talent identification in female field hockey. Can J Appl Physiol, 28 (3): 397-409.
13. Gualdi-Russo, E. & Zaccagni, L. (2001). Somatotype, role and performance in elite volleyball players. J Sports Med Phys Fitness, 41 (2): 256-62.
14. Drinkwater, E.J., Hopkins, W.G. & McKenna, M.J. (2007). Modeling age and secular differences in fitness between basketball players. J Sports Sci, 25 (8): 869-78.
15. Hoare, D.G. (2000). Predicting success in junior elite basketball players: the contribution of anthropometric and physiological attributes. J Sci Med Sport, 3 (4): 391-405.